

Pathogens & Communicable Diseases

Unit 3 Diseases & Prevention

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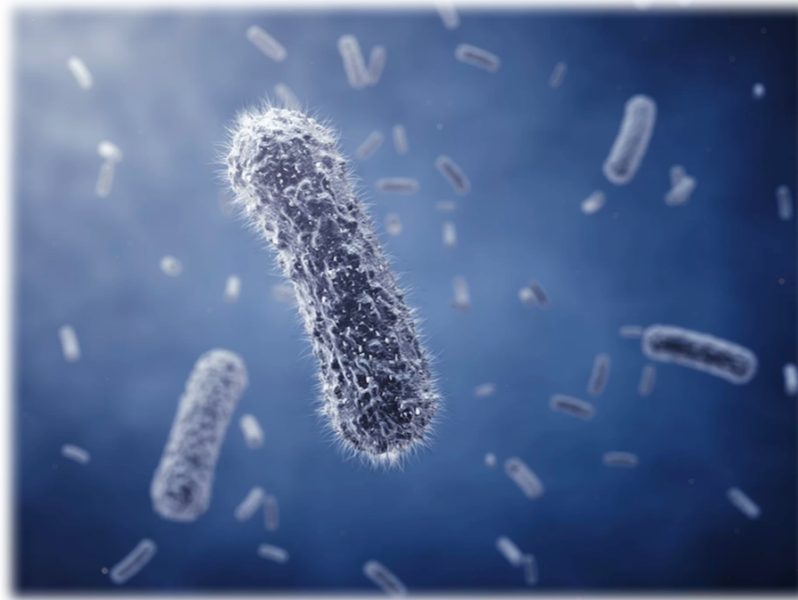
Pathogens & Communicable Diseases

- ▶ **Pathogen:** a germ that causes disease
- ▶ **Communicable disease/infection disease:** an illness caused by pathogens that can be spread from one living thing to another
- ▶ Four Types of Pathogens:
 - ▶ Bacteria
 - ▶ Fungi
 - ▶ Viruses
 - ▶ Protozoa



Bacteria

- ▶ Single-celled microorganisms
- ▶ Some bacteria are beneficial, but most are known to cause disease
- ▶ Cause disease by releasing toxins:
 - ▶ **Toxins** - poisonous substance
- ▶ Diseases caused by bacteria are:
 - ▶ Strep throat
 - ▶ Tuberculosis
 - ▶ Tetanus
 - ▶ Lyme disease
 - ▶ Syphilis
 - ▶ Gonorrhea



Overview of Bacterial infections

Bacterial meningitis

- *Streptococcus pneumoniae*
- *Neisseria meningitidis*
- *Haemophilus influenzae*
- *Streptococcus agalactiae*
- *Listeria monocytogenes*

Otitis media

- *Streptococcus pneumoniae*

Pneumonia

Community-acquired:

- *Streptococcus pneumoniae*
- *Haemophilus influenzae*
- *Staphylococcus aureus*

Atypical:

- *Mycoplasma pneumoniae*
- *Chlamydia pneumoniae*
- *Legionella pneumophila*

Tuberculosis

- *Mycobacterium tuberculosis*

Skin infections

- *Staphylococcus aureus*
- *Streptococcus pyogenes*
- *Pseudomonas aeruginosa*

Sexually transmitted diseases

- *Chlamydia trachomatis*
- *Neisseria gonorrhoeae*
- *Treponema pallidum*
- *Ureaplasma urealyticum*
- *Haemophilus ducreyi*

Eye infections

- *Staphylococcus aureus*
- *Neisseria gonorrhoeae*
- *Chlamydia trachomatis*

Sinusitis

- *Streptococcus pneumoniae*
- *Haemophilus influenzae*

Upper respiratory tract infection

- *Streptococcus pyogenes*
- *Haemophilus influenzae*

Gastritis

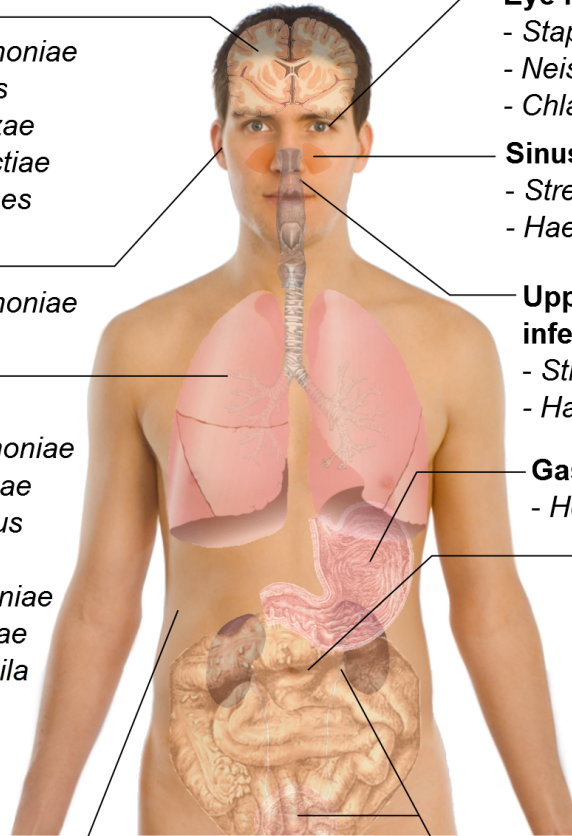
- *Helicobacter pylori*

Food poisoning

- *Campylobacter jejuni*
- *Salmonella*
- *Shigella*
- *Clostridium*
- *Staphylococcus aureus*
- *Escherichia coli*

Urinary tract infections

- *Escherichia coli*
- Other Enterobacteriaceae
- *Staphylococcus saprophyticus*
- *Pseudomonas aeruginosa*



Fungi

- ▶ Single or multi-celled parasitic organisms
- ▶ Obtain their food from organic materials
 - ▶ Plants, animals, humans
- ▶ Can live & develop disease on the skin, mucous membranes, & lungs
- ▶ Diseases caused by fungi are:
 - ▶ Athlete's foot
 - ▶ Ringworm
 - ▶ Jock itch
 - ▶ Nail infections
 - ▶ Thrush



Viruses

- ▶ One of the smallest known pathogens, non-living
- ▶ Multiplies in & takes over the cell → makes more viruses
- ▶ Spread rapidly
- ▶ Viruses cause diseases such as:
 - ▶ The common cold
 - ▶ Mumps
 - ▶ Hepatitis
 - ▶ Mononucleosis
 - ▶ Chicken pox
 - ▶ Influenza

Overview of Viral infections

Encephalitis/ meningitis

- JC virus
- Measles
- LCM virus
- Arbovirus
- Rabies

Common cold

- Rhinoviruses
- Parainfluenza virus
- Respiratory syncytial virus

Eye infections

- Herpes simplex virus
- Adenovirus
- Cytomegalovirus

Pharyngitis

- Adenovirus
- Epstein-Barr virus
- Cytomegalovirus

Gingivostomatitis

- Herpes simplex type 1

Parotitis

- Mumps virus

Pneumonia

- Influenza virus, Types A and B
- Parainfluenza virus
- Respiratory syncytial virus
- Adenovirus
- SARS coronavirus

Cardiovascular

- Coxsackie B virus

Hepatitis

- Hepatitis virus types A, B, C, D, E

Myelitis

- Poliovirus
- HTLV-I

Skin infections

- Varicella zoster virus
- Human herpesvirus 6
- Smallpox
- Molluscum contagiosum
- Human papillomavirus
- Parvovirus B19
- Rubella
- Measles
- Coxsackie A virus

Gastroenteritis

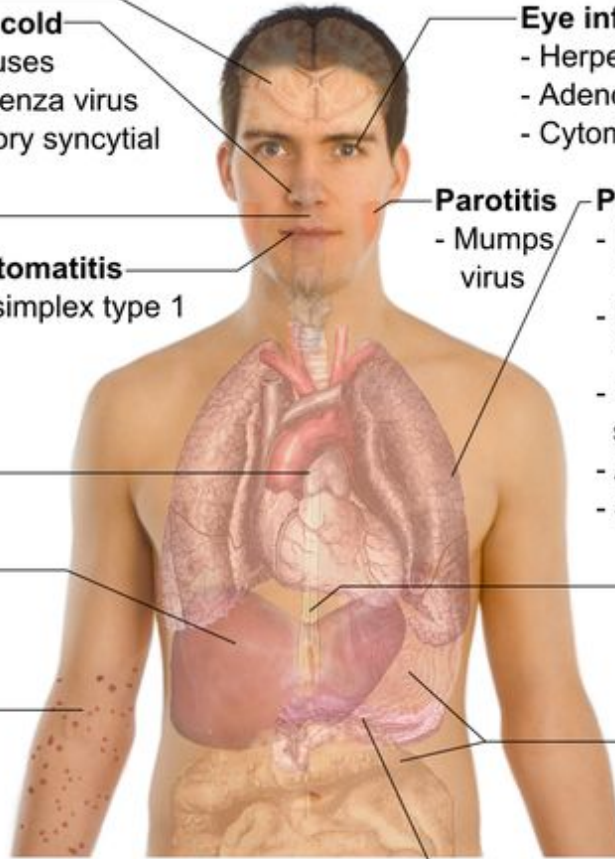
- Adenovirus
- Rotavirus
- Norovirus
- Astrovirus
- Coronavirus

Sexually transmitted diseases

- Herpes simplex type 2
- Human papillomavirus
- HIV

Pancreatitis

- Coxsackie B virus



Protozoa

- ▶ Tiny, single-cells organisms that produce toxins that cause disease
- ▶ Malaria is the main disease caused by protozoa
- ▶ **Helminth:** parasitic worm
 - ▶ Can develop if an individual eats undercooked pork, fish, or poor hygiene
 - ▶ I.e. tapeworms, pinworms, hookworms → affect digestive tract &/or muscle tissue & blood

How Are Pathogens Spread?

- ▶ Person-to-person contact
 - ▶ Shaking hands, kissing, sexual intercourse, receiving transfusions of another person's blood, touching ulcers/sores, handling bodily fluids (blood/urine)
- ▶ Airborne
 - ▶ Coughing, sneezing
- ▶ General contact
 - ▶ Contaminated objects – needles, combs, toothbrushes, razors, eating utensils
 - ▶ Handling/being bitten by an infected insect/animal
- ▶ Other:
 - ▶ Drinking contaminated water, eating infected food or undercooked meats, improper methods of canning/preparing foods, not washing hands after the restroom

Top 10 “Germiest” Places



The Immune System

- ▶ **What is Immune system's role in protecting our bodies from pathogens?**
 - ▶ System that removes harmful organisms from blood & combats pathogens
 - ▶ Comprised of body organs, tissues, cells, & chemicals that help detect & attack foreign substances in our bodies
 - ▶ Skin = barrier to prevent pathogens from entering the body
 - ▶ Mucous & hair help to trap & destroy pathogens
 - ▶ Other pathogens that are swallowed are destroyed by stomach acids

The Immune System

- ▶ **Lymphocytes:** white blood cells (WBC) that help the body fight pathogens
 - ▶ If a pathogen is present → lymphocytes multiply in lymph tissue to fight infection
 - ▶ Two Types:
 - ▶ **B-cell** – WBC that produces antibodies
 - ▶ **Antibody** – special protein that helps fight infection
 - ▶ **Helper-T cells** – WBC that signals B-cells to produce antibodies
 - ▶ **Macrophage** – WBC that surrounds & destroys pathogens
 - ▶ Antibodies attach to pathogens & make it easier for macrophages to destroy
 - ▶ Destroyed pathogens enter lymph, are filtered in lymph nodes, & removed by the spleen

The Immune System: Immunity

- ▶ The immune system helps people develop immunity
- ▶ **Immunity:** the body's resistance to disease-causing agents
- ▶ Two Types of Immunity:
 - ▶ **Active immunity:** resistance to disease due to the presence of antibodies
 - ▶ I.e. chicken pox, vaccinations
 - ▶ **Vaccine** – substance containing dead/weakened pathogens that is introduced into the body to give immunity
 - ▶ **Passive immunity:** results from introducing antibodies into a person's bloodstream

GROUP PROJECT 😊

- ▶ Choose a disease from the PowerPoint
- ▶ Define the pathogen that caused the disease:
 - ▶ Bacteria fungi, viruses, protozoa
- ▶ How can the disease be contracted/spread?
- ▶ How can the disease be identified?
 - ▶ Include signs/symptoms and
 - ▶ Any special exams/tests
- ▶ How does the disease affect the body?
- ▶ What are other possible types of diseases caused by this pathogen?
- ▶ What types of cures/treatments are available for it? (no cure, vaccinations, etc.)
- ▶ How long does it take to recover from the disease? (1 week, 1 month, etc.)
- ▶ How can we avoid becoming infected by the pathogen?
- ▶ **Create a worksheet for your classmates to take notes on (1 page minimum)**

POWERPOINT RUBIC: DISEASES PRESENTATION				
Element	Excellent	Satisfactory	Unsatisfactory	Points
Planning	Storyboard clearly & completely outlines the project	Storyboard only outlines some aspects of the project	Storyboard was created but missing multiple elements of the project	10
Organization	There is a logical sequence of information. Title slide & closing slide are included.	There are some logical sequence of information.	There is no logical sequence of information	10
Content	Presentation covers topic completely & in depth. Information is clear, appropriate, & accurate.	Presentation includes some essential information. Some information is confusing, incorrect, or flawed	Presentation includes minimal essential information. Information is confusing, inaccurate, or flawed	20
Multimedia & Design (graphics, animations, text, sound, videos)	Presentation is clean & appealing to the audience	Most multimedia elements contribute to the presentation. Some slides either have too little or too much text	No multimedia used or multimedia that detracts from the presentation	20
Language	Spelling & grammar are correct.	There are minor mistakes in spelling & grammar.	There are multiple grammatical & spelling errors throughout the presentation	20
Appearance	Presentation is clean & appealing to the audience	Presentation is somewhat appealing to the audience	Little to no attempt has been made to make the presentation appealing to the audience.	10
Summary/Works Cited	Summary of presentation & complete details of works cited	Summary does not clearly describe presentation & works cited has missing information	No summary &/or works cited	<u>10</u> 100 total points